

NEWS REPORT

NATIONAL ACADEMY OF SCIENCES NATIONAL RESEARCH COUNCIL



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NEWS REPORT

National Academy of Sciences National Research Council

VOLUME VII

September-October 1957

NUMBER 5

Investigation of Cancer Remedies

L. HENRY GARLAND, M. D.

Chairman, Committee on Cancer Diagnosis and Therapy

Nothing is so firmly believed as what we least know.—MONTAIGNE

THE COMMITTEE on Cancer Diagnosis and Therapy of the Division of Medical Sciences terminated its duties at the end of June this year. This article tells of the experience gained by this Committee in the relatively unexplored territory into which it ventured six and a half years ago.

The Committee was appointed in December 1950 in order to assist in the evaluation or investigation of new or unproved methods of diagnosing or treating cancer and was to serve as a panel of national experts in this difficult field. In the course of its existence the following persons have served on the Committee: L. Henry Garland, Leon O. Jacobson, David A. Karnofsky, Calvin T. Klopp, Ira T. Nathanson, Edward C. Reifstein, Jr., Emanuel B. Schoenbach, Danely P. Slaughter, Harold L. Stewart, Ambrose H. Storck, and M. C. Winternitz.

Better nutrition and sanitation, together with progress in the control of infectious diseases, have so lengthened the average life span as to elevate cancer to one of our major causes of death. Because of the fact that established forms of therapy sometimes offer but modest help in advanced

cases of cancer, the field of alleged therapy is indeed great on the part of those who hold out promise of alleviation or hope of cure. The physical and psychological problems incident to the terminal stages of some cases of cancer produce conditions favorable to an emotional reception of any new development no matter how tenuous. Ever lurking in the background of these developments is the possibility that one of them will aid a significant proportion of cases, and, therefore, it is the duty of the medical profession to investigate as many as possible, especially those in which there is some shred of scientific evidence to warrant study.

Unfortunately, many proposed forms of treatment are entirely devoid of background or reason. People tend to be quite objective in their attitudes towards such fantastic proposals *until* they are confronted with cancer in their own close circle. Their decisions then become influenced by deep-seated emotions. Even when skeptical, they will often take a relative to a charlatan, not out of faith, but out of desperation. Cost is not considered; indeed, in some cases the larger

the fee, the more satisfying is the feeling that something is being done—a sacrifice for the stricken one. For this reason, logic is often a poor weapon in combating quackery.

The harm done the terminal patient may be considerable, but does not approach the harm done when an unorthodox practitioner accepts a potentially curable case and uses worthless remedies until the disease has become truly incurable.

The great success of unorthodox practitioners arises from many elements, including fear and ignorance. Many persons who suspect they have cancer (but who do not) will consult such healers and constitute the bulk of their "cures." Many healers associate themselves with talented lawyers, religious fanatics, and thoughtless politicians, some or all of whom can present an impressive protective front or shield to the unsuspecting layman. This front can only be penetrated by courageous and able scientists thoroughly familiar with the vagaries of clinical cancer in humans.

The original Committee was sponsored by the American Association for Cancer Research, the American Cancer Society, the American Medical Association, the Damon Runyon Memorial Fund, the U. S. Food and Drug Administration, and the National Cancer Institute. Its members were chosen from a list of physicians of national repute in the field of cancer work, as being representative of the several disciplines of medicine commonly engaged in clinical cancer investigation and as being both authoritative and impartial. It was understood that the Committee, although interested in all measures related to cancer diagnosis and therapy, would be concerned chiefly with proposals which were not otherwise being evaluated, but which showed some promise or had caught the attention of presumably responsible persons in positions of authority who had requested such investigation.

Procedures

Conclusions as to the value of any therapeutic procedure in patients with advanced cancer are often fraught with error because of the variability of the natural course of

the disease, because of variations in the selection and size of clinical samples, and because of the difficulty of measuring objective regression of many types of the disease. Even when undisputed tumor regression does occur, it is necessary to determine if the regression is due to the agent under investigation, or to associated therapy, or to the late effects of antecedent treatment. For example, delayed response may occur about 3 months after radiation therapy. Similar time lapse is seen following some forms of chemotherapy. Knowing these facts, the Committee was particularly careful in the delineation of criteria which might permit sound evaluation of apparent beneficial effects of a given form of treatment.

Proponents of unorthodox methods tend to furnish "testimonials" rather than accurate scientific and clinical data. Their case reports often neglect objective findings, and neglect to note prior surgical or radiological treatment. Record summaries should carry spaces for the entry of all such pertinent data.

In a previous article in *NEWS REPORT* (Vol. III, pp. 73-75, 1953) reference is made to various documents prepared by the Committee during its formative years. These may be summarized as follows:

1) *Statement of policy.* This concerns the handling and acceptance of requests for investigations, the securing of supplies, the selection of investigators, and the summation of reports and their distribution.

2) *Criteria for evaluation of proposals for therapy and diagnosis of cancer in man.* These include suggested basic principles of evaluation studies, general criteria for diagnostic tests and therapeutic procedures, criteria regarding control data, statistical studies, and allied matters.

3) *Principles and procedures for evaluation of proposals.* These include specifications regarding the assemblage of information, the steps to be taken in order to secure cooperation from the diverse persons involved, and general scope of reports or opinions.

4) *Legal considerations pertaining to studies of new or unproven products and devices.* These include such matters as the

handling and disposition of confidential communications and records of meetings of investigating bodies, the responsibility of the practicing physician for the use of research drugs, and Federal and State regulations regarding therapeutic products.

5) *Model cancer therapy evaluation form.* This form consists of a folded sheet, standard page size, with blank spaces for entering necessary data concerning diagnosis, types of treatment given, laboratory and miscellaneous data, progress under treatment, reactions to therapy, and conclusions of the investigator.

This brief outline of these five documents does not do justice to the extended efforts which went into their formulation. Working in a new area, we were a group of medical scientists from diverse fields—geographic as well as academic. To have reached any agreement at all was, in retrospect, no small achievement, as well as a tribute to the tact of our efficient secretary, Dr. Isabel Wason.

Experiences

At the request of some of the sponsoring agencies, the Committee embarked upon a study of certain types of cancer therapy. It encountered two major types of complication: a) Inability to secure adequate supplies of the promised compound, and b) changes in the nature of the compound. Sometimes, as soon as investigation had been initiated, the proponent in question would inform the Committee that he was no longer using that particular formula but had an improved one. This recurred with each new effort to commence trials.

The first complication proved a considerable source of difficulty. Many proponents promised adequate supplies of their therapeutic agent for a reasonable number of tests and then at the last minute would state they were unable to provide the material. Some could not do so because of alleged complexity of manufacture, some because of alleged cost. When the Committee would seek confidential information on the precise formula, a rather incomprehensible collection of chemical data would often be furnished, usually useless for any serious attempt at reproduction.

In one allied investigation, the proponent actually furnished enough of the material to permit treatment of leukemia in *two* experimental animals (mice!). In another, the proponent stated blandly that if he could be furnished several hundred thousand dollars he might be able to make enough of the agent to permit him supplying an adequate amount for tests. This, after prior public and written assurances that he would furnish all necessary amounts of the drug.

The changing composition of the agent proved a tedious and frustrating feature. One unorthodox group used several different types of substance, and attempts to pin them down to a given limited set of preparations which might be subjected to trial proved futile.

With many unorthodox cancer remedies, the formula is secret, the technique of administration complex so that it must be administered only by or under the direction of the proponent himself, and the evaluation of response must be confirmed by him. When it is pointed out to these persons that the scientists who developed insulin or the sulpha drugs or penicillin were only too happy to provide full information as to composition, material for independent tests, and so forth, they have no adequate answer.

The Committee is greatly indebted to the several clinical investigators, chemists, and laboratory workers who did aid it in the actual analysis and testing of the diagnostic and therapeutic methods which it completed. Reports on these were furnished to the sponsoring agencies and are in the files of those organizations.

The Committee evaluated five proposals for the treatment of cancer and one proposal for its diagnosis. It compiled and reviewed information on several other methods, and, in response to requests, gave opinions on the need for other studies. In each case the proponent or his organization had made a request to one of the sponsoring agencies for evaluation of his proposal or had agreed to such an inquiry. Details concerning the procedures involved in the careful evaluation of these various methods are published in the his-

torical report of the Committee which has been transmitted to the sponsoring agencies. Unfortunately none of the proposals proved effective.

Nevertheless, the Committee did succeed in compiling valuable information on these several methods, plus extensive information on the literally dozens of other alleged cancer treatments both in this country and abroad. The Committee recommended that this valuable storehouse of information be catalogued and placed in the archives of a responsible national organization which would maintain and augment it and would make its contents available to scientists and bona fide inquirers throughout the country.

Concurrent Actions

While the Committee was engaged in these investigations, a number of other agencies or their branches developed comparable approaches to the problem. Committees of two state medical societies—California and Massachusetts—traced records and patients as a means of obtaining information on the results of therapy administered by certain proponents and compiled effective reports on four remedies. These reports were prepared under the auspices of the Cancer Commissions of the respective state medical associations. The U. S. Food and Drug Administration employed its powers of enforcement to prevent interstate shipment of some of these agents and to warn the public. The American Cancer Society appointed a Committee on New or Unproved Methods of Treatment to shoulder some of the responsibilities in this field. The National Cancer Institute established a Cancer Chemotherapy National Service Center in order to investigate the newer chemotherapeutic agents and indicated its willingness to investigate certain agents *which would meet its criteria*. The Bureau of Investigation of the American Medical Association continued its longstanding and distinguished work in the field of investigating certain remedies. In view of these developments, it was decided in the fall of 1955 that more effective progress might be made if the work of investigating new cancer diagnostic and

therapeutic methods were handled, at least initially, by cancer commissions established by the respective state medical associations. Through the efforts of the Committee, a suitable resolution to this effect was introduced and successfully adopted by the House of Delegates of the American Medical Association in 1955.

Following adoption of this resolution, representatives of the Committee attempted to seek its implementation through various means. However, it transpired that representatives of the medical associations in those states wherein unorthodox cancer problems were frequent felt that effective investigations at the state level would *not* be achieved with as much dispatch as is desirable. It was therefore decided at the final meeting of the Committee on Cancer Diagnosis and Therapy in April 1957 that the sponsoring agencies should be requested to seek continuation of the work of the Committee via a special committee of the American Cancer Society, this committee to include, if possible, physicians connected with or acceptable to national organizations dealing with the problem of cancer therapy (such as the American Medical Association, the U. S. Food and Drug Administration, the U. S. Public Health Service, etc.).

The following paragraphs summarize the Committee's recommendations:

a) That a suitable advisory committee to the American Cancer Society be created, the duties of which would include regular meetings to consider needs for and means of improving the investigation of cancer remedies, to supervise the compilation and filing of up-to-date information on such remedies, and to make arrangements for presenting its findings or conclusions to the medical profession for its guidance.

b) That, while unproven methods of cancer diagnosis or therapy may ordinarily best be investigated under the auspices of cancer commissions established by state medical associations, situations do arise under which investigation by some other body is advisable.

c) That it is desirable that precise information on the natural history of cancer in its various forms be compiled.

d) That there is need for greater restraint by investigators and institutions in publicizing *premature* optimistic reports on new diagnostic or therapeutic methods, since these are frequently quoted by proponents of controversial methods in support of their own premature claims.

In conclusion, it is our opinion that the problem of unorthodox methods for the diagnosis and treatment of cancer will continue to exist until methods of causation or prevention of this disease are discovered. Since cancer constitutes a heterogeneous group of conditions, it is to be anticipated that progress may well be made on some, but not all fronts.

New methods which have some logical or scientific basis for their genesis will continue to be tested by the medical profession without delay. However, methods of dubious merit and quite unscientific genesis will continue to arise and enjoy wide popular repute. When such methods result in needless delay in the proper treatment of curable cancer, they will continue to merit investigation and exposure.

Such investigations should, when possible, be made by qualified experts at the state level. Under certain circumstances,

local conditions influenced by prejudice or emotion, render it advisable that the investigation be supervised or conducted by a panel of experts from afar. The need therefore continues for a panel at the national level.

A subsidiary function of the panel would be to supervise the quinquennial or decennial issuance of a complete and informative index of new or unproved methods for cancer diagnosis and therapy.

The present Committee was dissolved because of the belief that the primary function of the National Academy of Sciences lay more in the broad domain of policy and advice rather than in the experimental evaluation of individual proposals in any of the professional fields. It believed that the latter function belonged to the profession involved or to one of its allied agencies. At the time of preparation of this report, the agency most appropriate would appear to be the American Cancer Society. However, the Division of Medical Sciences retains its interest in this problem, and will be happy to cooperate with any qualified organization that may wish to profit from the Committee's experience.

Office of Critical Tables

ALLEN V. ASTIN

Director, National Bureau of Standards

SURVEYS have shown that there is a definite national interest in developing a coordinated program leading to the production of comprehensive critical tables of numerical data on a current basis. The publication, *International Critical Tables of Numerical Data* (1926-33), was prepared under the auspices of the Divisions of Chemistry and Chemical Technology and of Physical Sciences of the National Academy of Sciences-National Research Council and was an invaluable compilation of numerical data on chemical compounds for investigators and engineers.

Since its publication, there has been a profound increase in the amount of numerical data of great value to research. There are many new and important areas that are not covered at all by the original international critical tables. The data are scattered throughout a multitude of publications in chemistry and physics. While efforts have been and are being made to compile data in certain fields, the task is far from complete and lacks coordination. There is a dire need for a concerted and well-planned program to make all valuable numerical data readily available for use in science and industry.

To this end, the Academy-Research Council in 1955 established the Office of Critical Tables in the Division of Chemistry and Chemical Technology, in collaboration with the Divisions of Physical Sciences, Earth Sciences, and Engineering and Industrial Research. An Executive Committee for the Office, made up of representatives of the four Divisions, was appointed and requested to survey the needs for critical tables and to recommend a procedure for their compilation. The present composition of this Committee is as follows: Allen V. Astin, Director of the National Bureau of Standards, *Chairman*; Edgar C. Bain, former Assistant Executive Vice President, Operations, U. S. Steel Corporation and Chairman of the Division of Engineering and Industrial Research; Francis Birch, Professor of Geology, Harvard University and Past Chairman of the Division of Earth Sciences; Robert B. Brode, Professor of Physics, University of California; and Frederick D. Rossini, Head of the Department of Chemistry, Carnegie Institute of Technology and Chairman of the Division of Chemistry and Chemical Technology.

The Committee recommended that the *International Critical Tables of Numerical Data* should not be revised as such because of the tremendous increase in amount of numerical data and consequent cost of publication. Instead they recommended that the Office of Critical Tables coordinate the activities of the various data compilation projects now in progress and initiate new projects in areas not being covered at present. Recognizing that one of the deficiencies of the former compilation was its lack of currency, the Committee recommended that the tables projects be maintained on a continuing basis with continual revision as necessary.

The Committee formulated objectives and stated the functions of the Office of Critical Tables as follows: 1) To survey the needs for critical tables of numerical data; 2) to stimulate and coordinate preparation or compilation of critical tables on a continuing basis; 3) to develop uniform editorial standards for presentation of data so that the various tables projects will be uniform as to quality and usefulness; and

4) to provide a central indexing and directory service with respect to all of the tables projects in progress.

It was also recommended that a large Advisory Board on Critical Tables be established. Its membership would include representatives of the various physical sciences, engineering, and technological organizations interested in or requiring critical data compilations, as well as representatives of governmental agencies interested in this field. The board may have as many as fifty or more members.

These recommendations were approved by the Division of Chemistry and Chemical Technology and by the Governing Board of the Academy-Research Council.

The Committee after an extensive search has appointed Guy Waddington, formerly with the U. S. Bureau of Mines, Director of the new Office. His ability in the field of physical chemistry is recognized internationally and his professional training and experience amply qualify him for the position. He assumed his new duties on October 7, 1957.

Data compilation projects are now in progress at the Carnegie Institute of Technology, Worcester Polytechnic Institute, National Academy of Sciences—National Research Council, National Bureau of Standards, and in the U. S. Bureau of Mines. Various industrial organizations and governmental agencies are supporting these data projects, such as the American Petroleum Institute, Manufacturing Chemists Association, Office of Ordnance Research of the Department of the Army, and Atomic Energy Commission.

The present operating costs of these projects total several hundred thousand dollars per year, and conceivably in a few years the operating costs of all data compilation projects may approach a million dollars per year. These costs will be borne by industry, trade associations, and U. S. Government agencies.

One of the functions of the Office of Critical Tables will be to coordinate these data compilation projects and maintain an index of available tables and a directory of the projects to assure ready availability of scientific numerical data to science and industry in the United States.

SCIENCE NEWS

AUTUMN MEETING NATIONAL ACADEMY OF SCIENCES

The autumn meeting of the National Academy of Sciences will be held at the Rockefeller Institute and the New York Botanical Garden in New York City, November 18-20. Please note the change of date from that announced in the last issue of NEWS REPORT. All scientific sessions during the meeting will be open to the public.

There will be brief scientific and business sessions on Monday morning, November 18, at the Rockefeller Institute. Luncheon for members and their guests as well as the afternoon scientific sessions will be held at the New York Botanical Garden. In the evening there will be an informal dinner at the Rockefeller Institute followed by a public lecture in Caspary Hall. After the lecture, President and Mrs. Detlev W. Bronk will be hosts at a reception for members and their guests at the President's House.

The morning and afternoon scientific sessions on Tuesday will be at the Rockefeller Institute. A reception will precede the Academy dinner for members and guests scheduled for Tuesday evening in Welch Hall of the Rockefeller Institute.

On Wednesday scientific sessions will be held in the morning and afternoon at the Rockefeller Institute.

Frank L. Horsfall, Jr., of the Rockefeller Institute is serving as Chairman of the Committee on Arrangements.

HUNGARIAN SCIENTISTS PROGRAM

The Academy's program to assist Hungarian scientists who left Hungary following the revolution of October 1956 is still in operation. The number of refugee scientists arriving in the United States during recent months is much smaller than six months ago, but the need to help these people find professional employment in the United States still exists. For this reason the Academy continues to maintain an office at the Hotel St. George in Brooklyn, N. Y., where new arrivals are interviewed

and subsequently are helped to find positions in universities, industry, or research institutions where they may continue their professional careers.

In August of this year, Wallace W. Atwood, Jr., Director of the Office of International Relations and Co-Director of the Academy's Hungarian Scientists Program, visited Vienna as a follow-up to the Academy's mission to Austria during April and May. From Vienna Dr. Atwood in company with H. L. Hardin, Director of the Vienna Office of the U. S. Immigration and Naturalization Service, visited Belgrade with the view of determining what assistance might be accorded Hungarian refugee scientists still in Yugoslavia.

Following discussions with representatives of the Yugoslav Government, the American Embassy, and the religious agencies engaged in helping the refugees, it was agreed that the Academy should enlist the services of two Hungarian-speaking American scientists to serve temporarily with the U. S. Immigration and Naturalization Service staff in Yugoslavia for the purpose of interviewing refugees with qualifications in the natural sciences. A few days later John Gergely, doctor of medicine and biochemist from the Massachusetts General Hospital, and Alex Mayer, physicist and mathematician from the Lincoln Laboratories at the Massachusetts Institute of Technology, left for Belgrade. During the three weeks that these scientists served with the U. S. Immigration and Naturalization Service, they interviewed approximately 60 Hungarian refugee scientists. Some of these people already have arrived in the United States and have accepted offers of professional employment.

From the best information available to the Academy, it is believed that refugee scientists from Hungary will continue to arrive in the United States for many months to come. Some will arrive from Austria and Yugoslavia, while others will reach the United States from Western European countries where they accepted temporary haven immediately following the revolution.

INTERNATIONAL UNION OF GEODESY AND GEOPHYSICS

The 11th General Assembly of the International Union of Geodesy and Geophysics (IUGG) was held in Toronto, Canada, September 3-14. The University of Toronto provided excellent facilities for the meeting, which proved to be one of the most active scientifically in the series of IUGG assemblies held so far. Undoubtedly, the International Geophysical Year contributed much to this high degree of scientific activity. Over 1,100 delegates from some forty-eight countries participated.

The United States was represented by the following delegation nominated by the National Academy of Sciences and appointed by the U. S. Department of State:

MAURICE EWING, Lamont Geological Observatory,
Chairman

LLOYD V. BERKNER, Associated Universities, Inc.

WALTER BUCHER, Columbia University

J. WALLACE JOYCE, National Science Foundation

JOSEPH KAPLAN, University of California at Los Angeles

F. W. REICHELDERFER, U. S. Weather Bureau

A. NELSON SAYRE, U. S. Geological Survey

WALDO E. SMITH, American Geophysical Union

The General Assembly program included numerous symposia and special sessions arranged for the most part by the individual associations which make up the Union, although a few were jointly sponsored. These sessions dealt with a wide range of subjects, such as the adjustment of large triangulation networks, electronic surveying, the use of the artificial earth satellite in geodetic measurements, sea gravity meters, magnitude and earthquake energy, crustal structure of continents and ocean basins, seismic investigations from nuclear explosions, paleomagnetism, physics of the upper atmosphere, atmospheric electricity, volcanology and the interior of the earth, radio meteorology, diffusion and convection (meteorology), numerical and graphical methods of dynamic weather predictions, radiation balance, jet streams and air masses, air mesometeorology, atmospheric chemistry and related matters, polar meteorology, abysmal circulation of oceans, and transfer of momentum from air to sea.

Modified statutes and by-laws were adopted which among other features pro-

vided for an enlarged Bureau of the Union and increases in country membership dues.

Plans were made in several associations for symposia to be held during the coming three-year period.

The officers and members of the Bureau of the Union elected for the next three years are:

J. TUZO WILSON (Canada), President

V. V. BELOUSOV (U.S.S.R.), Vice-President

W. A. HEISKANAN (Finland), Vice-President

COL. G. LACLAVERÈ (France), General Secretary

C. E. R. DEACON (United Kingdom), Member-at-large

J. W. JOYCE (United States), Member-at-large

C. TSUBOI (Japan), Member-at-large

One of the resolutions adopted by the Union dealt with a proposal to sink a drill hole through the earth's crust to the Mohorovičić discontinuity, presumably somewhere in the Pacific area where crustal thickness is a minimum.

The scientific consequences of the 11th General Assembly promise much, especially when coupled with the world-wide cooperative effort already under way in the International Geophysical Year.

MATHEMATICAL PROFILES

Several years ago an ad hoc committee of the Division of Mathematics made a survey of training and research in applied mathematics in the United States. One of the recommendations made by the committee was that the Division establish a standing Committee on Applications of Mathematics with the following functions:

- a) To facilitate cooperation among organizations concerned with various aspects of mathematics in applied settings;
- b) To call attention to the emergence of new areas in which significant applications of mathematics may be possible;
- c) To serve as a focus for the continuing scrutiny of problems concerned with training and research in mathematics as related to its applications; and
- d) To take whatever steps are deemed appropriate to enhance the effectiveness of mathematics in its applications.

Accordingly the new committee was established in October 1954. Mina S. Rees of Hunter College served as chairman until 1956 when she was replaced by A. S.

Householder of Oak Ridge National Laboratory. At its first meeting the committee quickly centered its attention on problems of training. Recognizing that the number of students being prepared was insufficient to meet the demands of government and industry, the committee decided to attack the problem at the high school level.

Among the many factors that tend to repel even superior students from taking courses in mathematics, one of the most important is lack of information about careers that are open to mathematicians, combined with a scant and often distorted conception of mathematicians and their activities. The committee felt that one way to make mathematics interesting is by making mathematicians interesting, and that this could best be done by preparing sketches, or profiles in the New Yorker sense, of living mathematicians and their work. It was thought that eight or ten subjects, including both men and women, and selected primarily from among young mathematicians in nonacademic employment, would be sufficiently representative.

While plans for preparing the profiles were being formulated, the committee learned that the National Council of Teachers of Mathematics was also planning the preparation and distribution of a brochure setting forth the cultural values of mathematics and the mathematical requirements of various occupations. After some discussion, the two groups agreed to join forces and issue one booklet containing the statement of requirements and the profiles. The preparation of this material is now in progress with the financial assistance of the National Science Foundation.

The present membership of the Committee on Applications of Mathematics is as follows:

- A. S. HOUSEHOLDER, Oak Ridge National Laboratory, *Chairman*
- P. R. GARABEDIAN, Stanford University
- LEONID HURWICZ, University of Minnesota
- MORRIS OSTROFSKY, Westinghouse Research Laboratories
- WILLIAM PRAGER, Brown University
- MINA S. REES, Hunter College
- R. F. RINEHART, Case Institute of Technology
- C. E. SHANNON, Massachusetts Institute of Technology
- S. M. ULAM, Los Alamos Scientific Laboratory

MARITIME CARGO TRANSPORTATION CONFERENCE

The Maritime Cargo Transportation Conference has opened an office in San Francisco to undertake a comprehensive study of all factors affecting the turn-around of general cargo ships in the San Francisco Bay area. The study group commenced operations on August 1 under the technical guidance of Pierpont B. Buck, Senior Analyst on the Conference staff. The group plans to spend over a year in the port collecting and analyzing data on various waterfront operations.

The purpose of the San Francisco study is to provide labor, management, and local government with pertinent facts, objectively obtained, in order to assist these groups in finding fair and effective solutions to many port problems of common concern.

The San Francisco Bay area, including San Francisco, Oakland, and Alameda, has been chosen as a sample port for study because its problems in the handling of general cargo are considered suitably typical of most U. S. ports and because of the attitudes of both labor and management toward the study there. Each has agreed to nominate members for a committee advisory to the Conference staff.

FIRST INTERNATIONAL SYMPOSIUM ON MILITARY PSYCHOLOGY

A new note in international cooperation was sounded in the convening of the First International Symposium on Military Psychology in Brussels on July 26 and 27 under the joint sponsorship of the Academy-Research Council and the Air Research and Development Command of the U. S. Air Force. About 200 psychologists from 15 European countries, the Near East, Canada, and the United States attended the two-day program of invited papers ranging freely over the content of military psychology.

Frank A. Geldard, Scientific Liaison Officer with the Office of Naval Research in London while on leave from the University of Virginia, served as General Chairman; and C. R. Myers of Canada, C. A. Chandessais of France, R. W. van der

Giessen of the Netherlands, and M. A. B. Wilson of the United Kingdom served as chairmen of the four daytime sessions. The one evening session featured an invited address by Arthur W. Melton on "Military Psychology in the United States of America."

The program of papers and the resulting discussions covered the following topics: Manpower analysis, selection and classification of personnel, military training and education, psychophysiology and human engineering, proficiency measurement, and military management and morale.

The Proceedings of the Symposium will be published under the auspices of the Academy-Research Council and will contain the 17 papers presented at the Symposium, abstracts in English and French of all contributions, digests of the discussions, and a suitable historical introduction in the preface.

SEVENTH INTERNATIONAL CANCER CONGRESS

The International Union Against Cancer will sponsor the Seventh International Cancer Congress in London, July 6-12, 1958. Scientists and physicians are invited to submit papers on experimental or clinical aspects of cancer or on cancer control. The deadline for registration without late fee and for the submission of papers is January 1, 1958. Preliminary programs, registration forms, and details regarding the submission of papers are available from—

- a) Harold F. Dorn, Secretary General of the International Union Against Cancer, National Institutes of Health, Bethesda 14, Maryland; or
- b) The Secretary General, Seventh International Cancer Congress, 45 Lincoln's Inn Fields, London, W. C. 2, England.

The USA National Committee on the International Union Against Cancer will be able to assist a limited number of United States scientists and physicians to attend the Congress by granting them travel allotments of about \$530 each. Further details regarding applications for travel allotments may be obtained from the USA National Committee, Academy-Research Council, Washington 25, D. C.

CONFERENCE ON EDUCATIONAL FILMS

The Mathematics Film Evaluation Board, established under the Advisory Board on Education of the Academy-Research Council, met at Pennsylvania State University, August 21-25, to study teaching films in mathematics and to develop criteria for production and use of such films. This study was one of the activities of the Advisory Board related to its objectives of improving the use of aids that science may bring to education, such as television, radio, and films. The members of the Film Evaluation Board, appointed through the Division of Mathematics are:

FRED A. FICKEN, University of Tennessee, *Chairman*
A. M. GLEASON, Harvard University
T. H. HILDEBRANDT, University of Michigan
C. HOCHSCHILD, Institute for Advanced Study
J. D. MANGILL, University of Alabama
BRUCE MESERVE, New Jersey State Teachers College.

In addition to the Board members, Paul Smith, Chairman of the Division of Mathematics, Philip Jones of the University of Michigan, and R. M. Whaley of the Advisory Board on Education also participated in the conference. C. R. Carpenter and A. W. van der Meer of Pennsylvania State University made valuable suggestions from their previous film and television experience.

The principal objective of the Board was to establish criteria or guide lines for proper and effective use of films and television in mathematics education. The participants viewed a variety of teaching films, including kinescopes of educational television lectures. The films were selected to cover a variety of topics in mathematics and a number of different grade levels.

The report of this conference, now in preparation, will cover specific recommendations regarding production of films and televised lectures, the impact such techniques may have on the teaching profession, proprietary interests, and the establishment of a standing committee reporting to the Advisory Board on Education for continual review of programs in the development of educational films and television in the field of mathematics. The Board

believed that the new media should be used for improving the quality of instruction and for raising the professional status of teachers, and not merely as techniques for recording or transmitting standardized lectures as ordinarily presented in a classroom.

PANEL ON FOOD ADDITIVES

On June 26, 1957, Congressman John Bell Williams, Chairman of the House of Representatives' Subcommittee on Health and Science, asked the President of the National Academy of Sciences, to nominate a panel of scientists to discuss the complex scientific problems involved in the case of food additives. In response to this request, the Academy-Research Council, through the Divisions of Biology and Agriculture and Medical Sciences, nominated the following panelists:

WILLIAM J. DARBY, Vanderbilt University, *Chairman*

PAUL R. CANNON, University of Chicago

HERBERT E. CARTER, University of Illinois

EMERSON DAY, Sloan-Kettering Institute for Cancer Research

WILLIAM D. DEICHMAN, University of Miami School of Medicine

JOHN H. FOLGER, I. E. du Pont de Nemours & Company

W. C. HUEPER, National Institutes of Health

MORTON L. LEVIN, New York State Department of Health

EMIL M. MRAK, University of California

HARVEY K. MURER, General Foods Corporation

F. N. PETERS, The Quaker Oats Company

R. BLACKWELL SMITH, Medical College of Virginia

MAURICE H. SEEVERS, University of Michigan

HENRY F. SMYTH, Jr., Mellon Institute

HOWARD C. SPENCER, The Dow Chemical Company

The panel met with the Congressional Committee on August 6 and 7. As a means of acquainting the panel members with their task and with each other, a briefing session was arranged on August 5 at which representatives of the House Committee and of the Academy-Research Council outlined the purposes of the panel discussion.

In the panel discussion before the Congressional Committee the subject of uses of chemical additives in food technology was developed by short statements from individual panel members. Discussion of

questions raised by Committee members and other panel members led to elaboration of the subject. Toxicologic testing and safety evaluation and the specific point of carcinogenicity were handled similarly.

PHOTOCHEMICAL STORAGE OF ENERGY

A Symposium on the Photochemical Storage of Energy was held at Endicott House, Dedham, Mass., September 3-7, under the sponsorship of the Subcommittee on Photochemical Storage of Energy. Twenty-six world experts in the field, eight of whom came from Europe, were invited to present papers and exchange ideas.

The purpose of the symposium was to review broadly the state of knowledge in certain areas of photochemistry and discuss the significance of these areas in the utilization of solar energy. Most of the papers presented dealt with the photochemistry of solid and liquid states since it is believed that such systems will be more feasible than gaseous systems for storing solar energy. Among the topics discussed were the solar battery, photolysis of nitrosyl chloride, photolysis of water, and the conversion of sunlight into electrical energy through photo oxidation and reduction.

Lawrence J. Heidt, a member of the Subcommittee from the Massachusetts Institute of Technology, arranged the symposium and served as its chairman. A grant from the National Science Foundation provided the necessary financial assistance.

PREVENTION OF DETERIORATION ABSTRACTS

The Prevention of Deterioration Center has announced the merging of its two publications, the *Prevention of Deterioration Abstracts* and the *Advanced List*. Beginning with Volume 15, Issue 1, shortly to appear, the *Abstracts* will include all the listings formerly given in the *Advanced List*, and, in order to increase the usefulness of the bibliographic material, a brief evaluation will accompany each item. The subject tabs will be retained as will the subject and author indexes. These changes are designed to enlarge the scope of the *Abstracts* without decreasing any of the previous services.

ROCKET AND SATELLITE CONFERENCE

An international conference on rocket and earth satellite programs for the International Geophysical Year (IGY) was held at the National Academy of Sciences in Washington from September 30 to October 5. This was the first international conference on the IGY to be held in the United States.

The conference was called by the Special Committee for the International Geophysical Year (CSAGI), which asked the U. S. National Committee for the IGY to serve as host. The conference brought together delegates from the various national committees participating in research rocket and satellite programs. Lloyd V. Berkner, President of the International Council of Scientific Unions and CSAGI reporter on rockets and satellites, was chairman of the conference, and Hugh Odishaw, Executive Director of the U. S. National Committee for IGY, was chairman of the General Arrangements Committee.

The following official delegates attended:

Australia K. E. BULLEN	United Kingdom ALASTAIR ANTHONY J. G. DAVIES
Canada D. C. ROSE L. F. SMITH	W. T. BLACKBAND H. S. W. MASSEY
Chile ENRIQUE ORTIZ	United States W. BERNING
Cuba JESUS FRANCISCO DE ALBEAR LUIS LARRACOITI	MICHAEL FERENCE JOHN P. HAGEN JOSEPH PALPAN HUGH ODISHAW H. PICKERING J. G. REID W. G. STROUD FRED L. WHIPPLE G. M. CLEMENCE N. C. GERSON J. HANESSIAN HOMER E. NEWELL W. J. O'SULLIVAN RICHARD W. PORTER ATHELSTAN SPILHAUS J. W. TOWNSEND P. H. WYCKOFF
Ecuador NEPTALI BONIFAZ ALFREDO SCHMITT CARLOS CASTRO	
France LT. GEN. J. GUERIN	
India A. P. MITRA	
Iran H. K. AFSHAR	
Japan TAKEO HATANAKA	U.S.S.R. A. A. BLAGONRAVOV SERGEI M. POLOSKOV A. M. KASATKIN
Peru JORGE A. BROGGI	

In addition to the above delegates from participating countries the following members of CSAGI attended:

SYDNEY CHAPMAN, President
LLOYD V. BERKNER, Vice President and Reporter
for Rocket and Satellite Programs
V. V. BELOUSSOV, Member
M. NICOLET, Secretary General
A. DAY, Coordinator
A. N. SHAPLEY, Reporter for World Days and
Communications

The conference opened with a plenary session on September 30, when status reports by the various national delegations were presented. The conference then divided into four working groups—rocketry; satellite vehicles, launching, and tracking; satellite internal instrumentation; and CSAGI manual on rockets and satellites. These groups met at various times from October 1 through October 4.

A number of special papers on satellite vehicles, launching and tracking, satellite ground-based scientific experiments, orbiting satellite devices and internal instrumentation, IGY rocketry program results, and IGY rocket research vehicles, techniques, and instrumentation were presented at special sessions.

The closing session of the conference was held on October 5. A. A. Blagonravov briefly described the Soviet satellite which had been launched on October 4. Conference resolutions were then presented. Detlev W. Bronk, President of the National Academy of Sciences, addressed the delegates, stressing the broad base of international cooperation which underlies the IGY program.

The resolutions, adopted unanimously, call for the prompt reporting of rocket firing data within two weeks after each firing to World Data Centers on special rocket flight information summary forms, developed and agreed on during the conference. The conference further resolved that there be a mutual interchange of rocket instrumentation and equipment and an interchange of personnel among countries participating in the IGY rocket program. The final resolution concerning rockets calls for simultaneous launching of rockets on June 18, 1958, during a World Meteorological Interval.

Resolutions concerning the earth satellite program emphasized the need for additional visual and optical stations for satellite tracking, especially in higher latitudes, and for additional radio receiving stations provid-

ing tracking and telemetry reception at 108 mc. per sec., 20 mc. per sec., and 40 mc. per sec.

The conference noted the possibility of using the facilities of existing ionospheric stations to receive satellite telemetered signals as well as the possibility of gaining interesting ionospheric data by means of radio amateur and volunteer observations of the Soviet satellite.

To implement the recommendation that additional telemetry stations be set up by research institutions and amateur radio groups, the conference recommended that both the United States and the U.S.S.R. provide advance data as to the forms of signals which they would transmit and that they also prepare articles about their systems to be disseminated to amateur radio groups.

The conference recommended that the United States and the U.S.S.R. make arrangements for the rapid dissemination of information on satellite orbits and stated that it considered the exchange of publications, technical data, and scientific instruments pertaining to satellites highly desirable.

The need for coordination in content of transmitted positional and orbital data and consistency of basic constants and standards used in computation was also noted; the conference recommended that interested national committees meet in the near future to discuss these matters.

The final group of resolutions concerned the need for additional coordination on those items that could not be settled at the conference and the need for continued programs of scientific research utilizing instrumented rockets and earth satellites after the close of the IGY. To this end the conference recommended that countries undertaking such plans make information concerning their plans available as soon as possible.

GEOGRAPHICAL FIELD RESEARCH IN FOREIGN AREAS

The Academy-Research Council is again offering opportunities for geographical field research in foreign areas to young geographers. This third annual program is under

the sponsorship of the Office of Naval Research.

The objective of the program is to strengthen American geography by stimulating greater participation by young Americans in field research in areas outside of the United States. Support will also be available to young scientists in related fields, such as geomorphology, climatology, ecology, and pedology.

The program is designed primarily for graduate students who wish to conduct field research in connection with their doctoral dissertations, but recent recipients of the doctorate are also eligible. The extent of financial assistance will vary according to the individual's needs. No stipend is provided, but travel, field, and living expenses are adequately covered. Preference will be given to field investigations of 6 or more months' duration. Recipients of support must agree to submit a detailed report of their investigations suitable for publication to the Division of Earth Sciences.

Applications for support of field work to commence before April 1, 1959, must be submitted prior to December 1, 1957. Notices of acceptance or rejection will be sent out promptly not later than the end of January 1958. Applications and requests for further information should be addressed to the Foreign Field Research Program, Division of Earth Sciences, Academy-Research Council, Washington, D. C.

SOUTHERN CALIFORNIA INDUSTRY-EDUCATION CONFERENCE

The Academy-Research Council's Advisory Board on Education and the Hughes Aircraft Company jointly sponsored a Southern California Industry-Education Conference at Lake Arrowhead, Calif., July 7-13. The purpose of the Conference was to assess educational needs in Southern California and to develop cooperative programs between industry and education. Programs in other parts of the country were described which have been successful in improving educational opportunities and the quality of course offerings and teaching.

Discussion groups developed specific rec-

ommendations which led to the establishment of the Southern California Industry-Education Council with the following members:

JOSEPH B. PLATT, President of Harvey Mudd College, *Chairman*
JACK COOPER, El Camino Junior College, *Executive Secretary*
EVERETT CHAFFEE, Associate Superintendent, Los Angeles City Schools
REAR ADM. C. F. HORNE, Vice President and Manager, Convair Division, General Dynamics Corporation
L. C. VAN ATTA, Hughes Aircraft Company
T. STANLEY WARBURTON, Superintendent, Fullerton Union High School and Junior College Districts, Fullerton, Calif.

The Conference charged the new Council to stimulate local industry-education programs throughout Southern California and to serve as a coordinating body. It will prepare a manual and issue monthly newsletters to facilitate communication of experiences and ideas. The Council will work for broad industrial representation and school participation.

SEVENTH WORLD CONGRESS ON THE WELFARE OF CRIPPLES

The International Society for the Welfare of Cripples held its Seventh World Congress in London, July 22-26, 1957, under the direction of its president, Howard A. Rusk.

The Prosthetics Research Board of the Academy-Research Council prepared and presented to the Congress a coordinated prosthetics exhibit which showed the organization, functions, and some of the results of the artificial limb program in the United States. In conjunction with the exhibit, the Board made available for free distribution copies of the March-April issue of *NEWS REPORT* (1957) containing the feature article "Studies in Prosthetics" by Gen. F. S. Strong, Jr., Chairman of the Board. The exhibit will be on display at other medical and scientific conventions during the winter and spring of 1957-58.

Among the United States participants in the Congress was A. Bennett Wilson, Jr., Staff Engineer of the Prosthetics Research Board. After the Congress, Mr. Wilson and five other men associated with the pros-

thetics research program in the United States went to Copenhagen to participate in the First International Prosthetics Course given under the sponsorship of the Committee on Prostheses, Braces and Technical Aids of the International Society for the Welfare of World Cripples. The course was attended by leaders in the field of prosthetics from 21 different countries.

STAFF APPOINTMENTS

Randall M. Whaley has been appointed Executive Director of the Advisory Board on Education of the Academy-Research Council. Dr. Whaley received his Ph. D. degree in Physics from Purdue University in 1947 and has done research on cosmic rays, solid state, and nuclear physics. He is currently on leave of absence from Purdue where he is Executive Assistant Head of the Department of Physics.

The U. S. National Committee for the International Geophysical Year (IGY) has appointed **Rear Adm. Blinn Van Mater**, U. S. Navy (ret.), Administrative Officer to replace R. C. Peavey, who resigned to become Manager, Joint Ventures, for Page Communications Engineers, Inc. Adm. Van Mater is an Annapolis graduate and before his retirement from the U. S. Navy served as Director of New Developments and Evaluation Division in the Office of Chief of Naval Operations.

The Academy-Research Council has announced the appointment of **Guy Waddington** as Director of the Office of Critical Tables. For the past seven years Dr. Waddington has been Chief of the Thermodynamics Branch of the U. S. Bureau of Mines Petroleum Experiment Station at Bartlesville, Okla. He is well-known for his writing on petroleum thermodynamics and has received the Distinguished Service Award of the Department of the Interior. He is also chairman of the Academy-Research Council's Subcommittee on Physicochemical Standards and is a member of the Commission on Chemical Thermodynamics and secretary of the Subcommittee on Experimental Thermochemistry of the International Union of Pure and Applied Chemistry.

The Maritime Cargo Transportation Conference has announced the appointment of **Col. Emory E. Hackman**, U. S. Air Force (ret.), as Transportation Specialist. Col. Hackman is a West Point graduate and has served with both the Army and Air Forces. He has taken extensive graduate work in physics at the University of Vir-

ginia and was a professor of physics at Georgetown University. For the past two years he has been associated with private research companies. Col. Hackman replaces **Brig. Gen. Ralph I. Glasgow**, U. S. Army (ret.), who is now the Washington representative and Assistant Vice-President of Consolidated Freightways.

RECORD OF MEETINGS

July

- 1-2 Building Research Advisory Board, Technical Studies Advisory Committee
- Highway Research Board, Department of Traffic and Operations, *Chicago*
- 1-3 Committee on Soil-Crop-Water Relationships, *Dallas*
- 7-13 Advisory Board on Education, Southern California Industry-Education Conference, *Lake Arrowhead, Calif.*
- 8 Panel on Oceanography
- 9 Federal Construction Council, Task Group on Cathodic Protection as Applied to Underground Structures
- 11 Federal Construction Council, Task Group on Selection and Maintenance of Air Filters
- 15 Titanium Sheet Rolling Panel, Subpanel on Heat Treatment, *Chicago*
- 16 Building Research Institute, Program Committee
- 17 Committee on Aerial Delivery Research, *Buffalo, N. Y.*
Ad hoc Meeting on Unesco Humid Tropics Program
- 17-18 Titanium Sheet Rolling Panel, Subpanel on Fabrication, *Dayton*
- 19 Committee on Textile Fabrics, *Natick, Mass.*
- 22-23 Committee on Soil and Water Conservation, *Chicago*
- 28-30 Committee on International Exchange of Persons, Linguistics Seminar, *Ann Arbor, Mich.*
- 29 Panel on Beryllium, Geology and Beneficiation Group, *Chicago*

August

- 1 Committee on Foods, Subcommittee on Microbiology, *Chicago*
- 2 Federal Construction Council, Task Group on Specifications and Working Drawings
- 5 Committee on Fire Research, Subcommittee on Abstract Bulletin

August

- 6 Federal Construction Council, Task Group on Under-Ground Pipe Installations and Systems
- 8 Federal Construction Council, Task Group on Cathodic Protection as Applied to Underground Metal Structures
- 13-14 Titanium Sheet Rolling Panel
- 14 Highway Research Board Executive Committee, Steering Committee, *LaSalle, Ill.*
- Toxicological Information Center, Executive Committee, *Meriden, N. H.*
- 15 National Advisory Committee for AASHO Road Test, *LaSalle, Ill.*
- Federal Construction Council, Review Committee on the Need for Plumbing Research
- Highway Research Board, Executive Committee, *LaSalle, Ill.*
- 17 Committee on Sanitary Engineering and Environment, Subcommittee on Personnel and Training
- 20 Highway Research Board, Department of Materials and Construction, Bituminous Division, *St. Louis*
- 21-25 Mathematics Film Evaluation Board, *University Park, Pa.*
- 24 American Institute of Biological Sciences, Governing Board, *Stanford, Calif.*
- 25-29 American Institute of Biological Sciences, Annual Meeting, *Stanford, Calif.*
- 26 Committee on Educational Policies, Panel on Undergraduate Curricula, *Stanford, Calif.*
- 28 Federal Construction Council, Operating Committee
- Panel on Beryllium, Physical Metallurgy Group, *New York City*
- 29 Subcommittee on Aerial Delivery Testing Equipment and Procedures, *Natick, Mass.*

NEW PUBLICATIONS

- Conference Board of Associated Research Councils. Committee on International Exchange of Persons. *United States Government Awards under the Fulbright Act. 1958-59 Awards for University Lecturing and Postdoctoral Research in Argentina, Chile, Columbia, Ecuador, Peru.* Washington, 1957. 8 p.
- Federal Construction Council. *Cooling Towers and Evaporative Condensers. A Report by Task Group T-8 . . . Prepared and Edited by S. A. Heider and F. A. Govan.* Washington, NAS-NRC, Building Research Institute, 1957. (Technical Reprint no. 13) 46 p. \$1.00.
- Federal Construction Council. *Paint for Structures. A report by Task Group T-18 . . . Prepared and Edited by S. A. Heider and F. A. Govan.* Washington, NAS-NRC, Building Research Institute, 1957. (Technical Reprint no. 14.) 30 p. \$1.00.
- Hatheway, William H. *Races of Maize in Cuba.* Washington, NAS-NRC, Committee on Preservation of Indigenous Strains of Maize, 1957. (NAS-NRC Publication 453.) 75 p. \$1.50.
- The International Institute of Refrigeration and the U.S.A.* Washington, NAS-NRC, 1957. 10 p.
- Lund, Herbert Z. *Tumors of the Skin.* Washington, Armed Forces Institute of Pathology, 1957. (*Atlas of Tumor Pathology.* Section I, Fasc. 2.) 330 p., illus. \$3.00. (Available from: American Registry of Pathology, Armed Forces Institute of Pathology, Washington 25, D. C.)
- National Research Council. Committee on Animal Nutrition. *Nutrient Requirements of Domestic Animals. Number V, Nutrient Requirements of Sheep, Revised 1957.* Washington, 1957. (NAS-NRC Publication 504.) 33 p., illus. \$1.00.
- National Research Council. Committee on Nuclear Science. Subcommittee on Radiobiology. *Basic Mechanisms in Radiobiology. V. Mammalian Aspects. Proceedings of an Informal Conference, Highland Park, Illinois, May 14-16, 1956.* Washington, NAS-NRC, 1957. (NAS-NRC Publication 513.) 203 p. \$2.00.
- National Research Council. Committee on Waste Disposal. *Disposal of Radioactive Waste on Land.* Washington, 1957. (NAS-NRC Publication 519.) 142 p. \$1.00.
- National Research Council. Conference on Electrical Insulation. *Annual Report, 1956.* Washington, 1957. (NAS-NRC Publication 512.) 63 p. \$3.00.
- National Research Council. Highway Research Board. *Photogrammetry and Aerial Surveys, a Symposium . . .* Washington, 1957. (NAS-NRC Publication 494. Highway Research Board Bulletin 157.) 59 p., illus. \$1.00.
- National Research Council. Highway Research Board. Committee on Roadside Development. *Roadside Development, 1957.* Washington, 1957. (NAS-NRC Publication 496.) 88 p., illus. \$2.00.
- Spector, William S., ed. *Handbook of Toxicology. Volume II, Antibiotics. Prepared under the Direction of the Committee on the Handbook of Biological Data, Division of Biology and Agriculture, The National Academy of Sciences, The National Research Council.* Philadelphia, W. B. Saunders Company, 1957. 264 p. \$6.00.
- United States National Committee for the International Geophysical Year. *Antarctic Program, September 1957.* Washington, NAS-NRC, 1957. (NAS-NRC Publication 553.) 58 p. \$1.00.

Notice of Academy Meetings

NATIONAL ACADEMY OF SCIENCES

Autumn Meeting, New York City, November 18-20, 1957

Annual Meeting, Washington, D. C., April 28-30, 1958

NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL

Governing Board, Washington, D. C., October 13, 1957

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